

## INTERNATIONAL SEARCH REPORT

International application No.  
PCT/KR2004/002265

**A. CLASSIFICATION OF SUBJECT MATTER****IPC7 F23N 5/02**

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC7 F23N 5/02; F03G 7/06; F16K 17/02, 17/38, 31/122, 31/126, 31/64, 31/68; F22G 5/04; F22D5/08

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean Patents and applications for inventions since 1975

Korean Utility models and applications for Utility models since 1975

Japanese Utility models and application for Utility models since 1975

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	EP 55813 A (SASSERATH & CO KG H) 14 July 1982 See the abstract; figure	1, 2.
Y	JP 64-024177 A (HASHIGUCHI HAJIME) 26 January 1989 See the whole document	1, 2.
A	US 3756083 A (TOYO KOGYO CO.) 4 September 1973 See the whole document	1, 2

☐ Further documents are listed in the continuation of Box C.☐ See patent family annex.

\* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&amp;" document member of the same patent family

Date of the actual completion of the international search

22 FEBRUARY 2005 (22.02.2005)

Date of mailing of the international search report

24 FEBRUARY 2005 (24.02.2005)

Name and mailing address of the ISA/KR



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## Box No. II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 3 - 10  
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:  
See the Supplemental Box
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box No. III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

The application does not meet the requirement for the unity of invention set forth in PCT Articles 3(4)(iii), 34(3) and Rule 13.1. It is immediately evident "a priori" that the independent claims relate to two different problems and have little in common.

Claimed invention (i): claims 1 and 2 are directed to a thermally operated valve.

Claimed invention (ii): claims 3-10 are directed to an automatic circulation device of warm water.

While it can be said that the claimed invention (i) is one of the special technical features of the claimed invention (ii), nevertheless, this does not provide a required novel concept in that the claimed invention is known from D1 and D2.

1. ☐ As all required additional search fees were timely paid by the applicant, this international search report covers all searchable claims.
2. ☒ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

### Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

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In continuation of Box No. II

Claims 3-10 are so unclear that no opinion could be formulated as to novelty or inventive step.

The problem with claims 3-10 is that the working of the automatic circulation device of said claims leaves the reader in doubt. According to the description, the water circulation of the device is caused by the vapor pressure created by heating of the boiler, and consequently no other pressurizing means is needed. However, there is much doubt whether the vapor pressure of the circulation pipes could be increased large enough to render the water circulate because it is described in the description that water in the boiler will not be heated up to 100°C by the function of the gas control valve. Since a specific volume of water does not increase much before boiling, the pressure rise in the boiler of the present invention would result in merely a slight change.